Practice: 666 - Forest Stand Improvement

Scenario: #1 - Pre-commercial Thinning - Hand tools

Scenario Description:

Adjusting the stocking of a young, non-merchantable stand of pine trees. The operation is carried out using hand tools such as machetes, axes, brush hooks, chainsaws or other approved hand cutting tools.

Before Situation:

The stocking of a stand of pine trees that are too small to make a commercial thinning exceeds the recommended fully stocked level for the species and site. The effect is much slower growth than is reasonable or expected for the site, increased susceptibility to insects and disease, and an unacceptable devastating wildfire risk. Resource concerns include undesirable plant productivity and health; wildlife habitat degradation; wildfire hazard; and inadequate structure and composition.

After Situation:

After completing a pre-commercial thinning operation, the number of trees on the site will be much less than the before operation numbers. The remaining trees will have space to grow making them healthier and more capable of withstanding insect and disease. After adjusting the stocking to an acceptable level, stand growth, condition, and overall quality is improved. In addition, wildlife habitat is improved with the resulting increase of sunlight reaching the forest floor causing more desirable forbs and shrubs to grow. The vertical structure of the stand is improved as the understory plants have a chance to develop. The improved growing conditions and more open canopy cover reduces the likelyhood of wildfires.

Scenario Feature Measure: Area treated

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: $1,381.59 **Scenario Cost/Unit:** $138.16

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	$5.36	40	$214.40
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$31.63	8	$253.04
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.11	40	$724.40
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$37.95	5	$189.75

Practice: 666 - Forest Stand Improvement

Scenario: #2 - Timber Stand Improvement - Single Stem Treatment

Scenario Description:

Altering the composition and stocking of a stand of trees by means of individual stem treatment such as stem injection or basal bark spraying. The trees to be retained are marked by a consultant forester or other forestry professional.

Before Situation:

The existing condition of the pine stand cannot meet the landowners objectives because the composition consists of unwanted hardwood species and the stocking exceeds the recommended level. The species and quality of the trees to be controlled makes a commercial operation unfeasible. Resource concerns include undesirable plant productivity and health; wildlife habitat degradation; wildfire hazard; and inadequate structure and composition.

After Situation:

Using a single stem treatment the resulting stand is comprised with desirable trees with the poorly formed and less desirable trees and/or shrubs removed. The remaining trees on the site are of desirable species and quality and they are free to grow as the competition for nutrients and water is reduced by the removal of the poor quality or less desirable trees. The composition of the stand can meet the landowners objectives and the growth, condition and quality of the remaining trees is improved. Wildlife habitat is improved as desirable trees are left in the stand along with improved structure. The improved stand structure and tree growth also reduces the likelyhood of wildfires.

Scenario Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 10

Scenario Cost: $998.08 **Scenario Cost/Unit:** $99.81

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hour	$48.33	5	$241.65
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$31.63	4	$126.52
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$96.04	4	$384.16
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	$15.63	5	$78.15
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	$41.50	2	$83.00
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acre	$42.30	2	$84.60

Practice: 666 - Forest Stand Improvement

Scenario: #3 - Timber Stand Improvement - Chemical, Ground

Scenario Description:

Using ground equipment as an over-the-top chemical spray applied to release young desirable pine trees from competing and/or overtopping hardwood vegetation. Skidders, tractors or other ground equipment will be used to spray a selected herbicide, according to label directions, to remove targeted deciduous tree or shrub species.

Before Situation:

An adequately stocked stand of desirable pine trees is not growing to its potential for the site due to severe competition from undesirable hardwood trees and brush. Resource concerns include: Undesirable plant productivity and health, and wildlife habitat degradation.

After Situation:

The pine trees are free to grow with the competition from the less desirable hardwood trees removed by spraying an appropriate herbicide using skidders, tractors or other ground equipment. The residual trees will have more space, water and nutrients improving their growth and development. The reduction of the less desirable hardwood stems will allow more beneficial forbs and shrubs to grow as a result of sunlight reaching the forest floor. The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.

Scenario Feature Measure: Acres treated

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: $5,513.36 **Scenario Cost/Unit:** $137.83

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$31.63	24	$759.12
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.94	40	$197.60
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$37.95	24	$910.80
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.11	24	$434.64
Materials						
Herbicide, Sulfometuron-methyl	340	Used for the control of annual and perennial grasses and broad leaved weeds in non-crop land. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	$38.78	40	$1,551.20
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	$41.50	40	$1,660.00

Practice: 666 - Forest Stand Improvement

Scenario: #4 - Timber Stand Improvement - Chemical, Aerial

Scenario Description:

Using an aerially applied herbicide, according to label directions, to release desirable trees from competing and/or overtopping vegetation. Helicopters are the primary source of spraying over-the-top forestry herbicides but other aerial methods can be used as well. The work will be professionally planned and supervised.

Before Situation:

An adequately stocked stand of desirable pine trees is not growing to its potential for the site due to severe competition from undesirable hardwood trees and brush. Resource concerns include: Undesirable plant productivity and health, and wildlife habitat degradation.

After Situation:

The pine trees are free to grow with the competition from the less desirable hardwood trees removed by spraying an appropriate herbicide using helicopters or other aerial equipment. The residual trees will have more space, water and nutrients improving their growth and development. The reduction of the less desirable hardwood stems will allow more beneficial forbs and shrubs to grow as a result of sunlight reaching the forest floor. The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.

Scenario Feature Measure: Area treated

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: $5,019.26 **Scenario Cost/Unit:** $125.48

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Chemical, aerial application, helicopter	1991	Chemical application performed by helicopter on forest only. Includes equipment, mobilization, and labor.	Acre	$30.83	40	$1,233.20
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$31.63	4	$126.52
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$37.95	2	$75.90
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.11	4	$72.44
Materials						
Herbicide, Sulfometuron methyl & Hexazinone	1282	Broad spectrum herbicide for residual weed control for christmas trees and other trees. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	$23.67	40	$946.80
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	$22.61	40	$904.40
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	$41.50	40	$1,660.00

Practice: 666 - Forest Stand Improvement

Scenario: #5 - Competition Control - Mechanical, Light Equipment

Scenario Description:

Using light equipment such as a tractor with brush hog or a small dozer to control vegetation that is competing with desirable trees and species or to reduce the stocking level of a stand of desirable trees. The current trees are small enough that they can be mowed or shredded. The work can be done by mowing or shredding strips through the stand leaving strips of desirable trees.

Before Situation:

A stand of young, desirable pine trees is adversely affected by competition because the stand is overstocked. Resource concerns include undesirable plant productivity and health; wildlife habitat degradation; wildfire hazard; and inadequate structure and composition.

After Situation:

The post treatment stand will have strips of desirable trees remaining on the site created by mowing or shredding strips through the stand of trees. The remaining trees will be desirable species that are free to grow with the competition reduced. The productivity and health of the remaining trees is enhanced and the wildfire hazard will be reduced. Wildlife habitat and structure is improved as more desirable plants and shrubs can grow following removal of some of the trees. After adjusting the stocking to an acceptable level and/or controlling the competing vegetation, stand growth, condition, and overall quality of the stand is improved.

Scenario Feature Measure: Area Treated

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: $326.60 **Scenario Cost/Unit:** $32.66

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	$16.54	10	$165.40
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.15	8	$161.20

Practice: 666 - Forest Stand Improvement

Scenario: #6 - Competition Control - Mechanical, Heavy Equipment

Scenario Description:

Using equipment such as a bulldozer, drum chopper or other approved methods to control woody vegetation that is competing with desirable trees or to reduce the stocking level of a dense stand of desirable trees. The trees to be retained will be marked by a consultant or forestry professional.

Before Situation:

A stand of desirable trees is adversely affected by competition either from undesirable species, cull trees, or because the stand is overstocked. The vegetation to be controlled is too large to be mowed or shredded. Resource concerns include undesirable plant productivity and health; wildlife habitat degradation; wildfire hazard; and inadequate structure and composition.

After Situation:

The stand of trees is more open with the desirable trees remaining. The heavy equipment removed the less desirable species and poorly formed trees or a reduction in the number of trees per acre in a dense stand of desirable trees. The TSI improved the health and productivity of the residual trees while reducing the wildfire hazards. Wildlife habitat and structure is improved as sunlight can reach the forest floor increasing desirable plants and shrubs. The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.

Scenario Feature Measure: Area treated

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: $3,343.28 **Scenario Cost/Unit:** $334.33

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Mechanical cutter, chopper	943	Masticator, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hour	$109.28	8	$874.24
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$31.63	8	$253.04
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$105.78	8	$846.24
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$23.61	16	$377.76
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.15	8	$161.20
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$415.40	2	$830.80

Practice: 666 - Forest Stand Improvement

Scenario: #7 - Creating Patch Clearcuts

Scenario Description:

Creating 2 acre patches in over-mature and/or degraded stands using hand tools such as chainsaws. The cleared patches are areas that can be used to initiate new trees or to promote wildlife habitat. Creating small openings by cutting all trees greater than 2" in diameter will foster the regeneration of high-value shade intolerant species.

Before Situation:

The existing stand is overly mature and/or has been degraded in value by past harvesting practices. The level of acceptable growing stock is too low to justify managing this stand in its present condition. The present form, species composition and structure cannot meet the resource concerns and landowner objectives. Resource concerns include: Undesirable plant productivity and health, inadequate structure and composition, and habitat degradation.

After Situation:

Patch clearcuts or openings created conditions where a new, young stand of desirable species is established improving forest health and productivity. The small patch clearcuts may also be used to create early successional wildlife habitat improving plant diversity and structure. The stand of trees is still present with the additions of the small cleared areas.

Scenario Feature Measure: Area treated

Scenario Unit: Acre

Scenario Typical Size: 2

Scenario Cost: $376.53 **Scenario Cost/Unit:** $188.27

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	$5.36	12	$64.32
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$31.63	3	$94.89
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.11	12	$217.32

Practice: 666 - Forest Stand Improvement

Scenario: #8 - Thinning for Wildlife and Forest Health

Scenario Description:

A densely stocked oak/hickory timber stand will be thinned to a basal area of 40-60 sqft/acre, in an effort to improve wildlife habitat by creating an open canopy, moderately stocked, mature forest with an herbaceous understory. Thinning and timber stand improvement will occur using applications that will include hack-n-squirt, basal bark, girdling or stump cut. This practice only applies to a land use meeting the official NRCS definition of "Forest". For rangeland/savannah fields refer to Brush Management (314). This practice only applies to a land use meeting the official NRCS definition of "Forest". For rangeland/savannah fields refer to Brush Management (314).

Before Situation:

The stand of trees is overstocked resulting in a closed canopy which provides very little sunlight to reach the forest floor. The basal area is excessively high and herbaceous ground cover is minimal. This condition is causing a lack of structure, herbaceous layer, and diversity that is needed to meet the landowner's objectives for improved wildlife habitat and forest health. Resource concerns include: Inadequate structure and composition, undesirable plant productivity and health, and habitat degradation.

After Situation:

Selected trees will be targeted for control which will reduce the canopy cover and number of trees per acre. The stand will evolve toward an open canopy, moderately stocked, mature forest with an herbaceous understory, thus improving the wildlife habitat of the desireable wildlife species. The canopy is opened to the extent necessary to promote herbaceous growth and the work is performed with minimal damage to the residual trees and site.

Scenario Feature Measure: Acres treated

Scenario Unit: Acre

Scenario Typical Size: 10

Scenario Cost: $958.41 **Scenario Cost/Unit:** $95.84

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	$5.36	8	$42.88
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hour	$48.33	8	$386.64
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$31.63	1	$31.63
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.11	16	$289.76
Materials						
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	$41.50	5	$207.50

Practice: 666 - Forest Stand Improvement

Scenario: #9 - TSI - Mulching

Scenario Description:

Densely stocked, pine, oak-hickory or hardwood-pine timber stands will be thinned in an effort to improve wildlife habitat, promote healthy trees and minimize the risk of wildfires. Mulching uses heavy mechanical equipment (e.g. masticator) that cuts and shreads small trees, shrubs and other vegetation leaving very little on the site except for the residual trees and shreaded material.

Before Situation:

Overstocked pine, hardwood or hardwood-pine stands resulting in degraded tree health and condition resulting in degraded wildlife habitat. The resource concerns include: Soil erosion; plant suitability - intended use; plant condition - productivity, health and vigor; wildlife habitat - inadequate food and cover.

After Situation:

The typical area treated will be approximately 40 acres in size, however, smaller and larger tract sizes are commonly treated using mulching. The stand will look very good with the residual trees covering the site and the poor form, damaged or undesirable trees removed from the stand. The stand is open underneath allowing herbaceous vegetation to return to the site along with some understory shrubs that are beneficial to wildlife. Also, the wildfire potential has been decreased as the fuel is now in low contact with the ground.

Scenario Feature Measure: acres

Scenario Unit: Acre

Scenario Typical Size: 40

Scenario Cost: $12,748.44 **Scenario Cost/Unit:** $318.71

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$31.63	8	$253.04
Mechanical cutter, chopper	943	Masticator, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hour	$109.28	80	$8,742.40
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$23.61	80	$1,888.80
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.11	80	$1,448.80
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$415.40	1	$415.40